Development of banana pollen.—An extensive investigation[21] of three races of the edible banana (*Musa sapientum*) has shown that they can be distinguished by the number of chromosomes, "*Dole*" having 8, "Radjah Siam" 16, and "Kladi" 24, as the haploid numbers, so that the races might be designated as vars. *univalens*, *bivalens*, and *trivalens*. The volume of the nuclei, but not their surfaces, is in the ratio 1:2:3. With the increase in the number of chromosomes came disturbances in the development of pollen, some of the chromosomes not passing to the poles, but remaining behind and forming extra nuclei. The size of the tetrad varies in a given anther, although the number of chromosomes in the entire tetrad is constant. Sometimes as many as eight pollen grains are formed from a single mother cell.

Prochromosomes are easily distinguished in the pollen mother cell, and in *Musa Dole* TISCHLER was able to show that the number of prochromosomes was equal to the diploid number of chromosomes. Probably there is a fusion of prochromosomes at synapsis. The splitting of chromosomes at the strepsonema stage TISCHLER regards as genuine and not merely apparent.—CHARLES J. CHAMBERLAIN.

Parthenogenesis in Taraxacum.—Parthenogenesis in *Taraxacum* has been investigated again, this time by SCHKORBATOW[22] who writes in Russian, but adds a summary in German, from which the following points are taken: The removal of anthers does not in any way affect the germination of seeds. Various colors of seeds, like clear green and dark brown, may become fixed and hereditary. At metaphase of the first division in the embryo sac, the chromosomes show various and characteristic forms, but the chromosomes seldom take the arrangement belonging to the heterotypic mitosis, and when they do, the author regards the phenomena as atavistic. Amitotic divisions occur in the embryo sac, in the endosperm, and in early stages of the embryo, in the last case all the nuclei but one becoming resorbed, so that the cells are left uninucleate.—CHARLES J. CHAMBERLAIN.

The origin of the vacuole.—Probably most botanists believe that the large vacuoles of plants arise by the coalescence of numerous smaller ones. A paper by BENSLEY,[23] dealing with the canalicular apparatus of animals, gives also a description of root tips and the tapetum of anthers. The fixing agent used was: neutral formalin (freshly distilled), 10 cc.; water, 90 cc.; potassium bichromate, 2.5 g.; mercuric chloride, 5.0 g. With this fixing

[21] TISCHLER, G., Untersuchungen über die Entwickelung des Bananen-Pollens. I. Archiv. für Zellforschung **5**:622–670. *pls. 30, 31.* 1910.

[22] SCHKORBATOW, L., Parthenogenetische und apogame Entwickelung bei den Blüthenpflanzen Entwickelungsgeschichtliche Studien an *Taraxacum officinale* Wigg. Bot. Institut Charkow. pp. 43. *pl. 1. figs. 4.* 1910.

[23] BENSLEY, R. R., On the nature of the canalicular apparatus of animal cells. Biol. Bull. **19**:174–194. *figs. 1–3.* 1910.